Chapter 6: Mitigation Requirements

The draft programmatic environmental assessment referenced mitigation as a requirement in the vegetation management prescriptions in Appendix H and under table 4-13 for the narrow shoreline variances. No mitigation would be required for the status quo, but mitigation would be required for the narrow shoreline variances. Mitigation requirements would be tiered to Section 8 of the Lewisville Programmatic Environmental Assessment dated September 30, 1999, to offset the additional 158 acres impacted by the narrow shoreline variances. In order for an adjacent property owner to obtain a shoreline use permit, these clearly-stated mitigation measures would be listed as a condition of the permit if the permittee intends to mow past the normal mowing and underbrushing zone in a narrow shoreline variance.

In lieu of a butterfly garden or minimal tree plantings in the narrow shoreline variances as mentioned in the draft programmatic environmental assessment, permittees would remit mitigation in cash or in volunteer services to implement habitat prescriptions in habitat management zones designated by USACE, with coordination from U.S. Fish and Wildlife Service, for a positive gain in habitat value resulting in true mitigation. In all shoreline areas that are not in designated narrow shoreline variances, no permits would be issued to mow beyond the normal mowing and underbrushing zone unless it was part of the vegetation management prescriptions used as management control to improve habitat quality.

When a shoreline use permit is requested and it is in an area that a narrow shoreline variance could be granted, then a USACE Park Ranger along with the requestor would determine how many square feet would be included in the narrow shoreline variance. A USACE biologist using best professional judgment would then assess the quality of the area and assign a mitigation ratio and a cost for mitigation as indicated in mitigation cost schedule in Appendix L. At that point, the requestor could decide not to request a variance, make a payment for the mitigation and be issued a shoreline use permit with a narrow shoreline variance, or sign a volunteer agreement and have the allotted time identified within the conditions of the permit to complete the required number of volunteer hours as outlined in the mitigation cost schedule in Appendix L. Volunteer hours would be used to implement vegetation management prescriptions on a USACE designated portion of land under direct supervision of USACE or its representative. If volunteer hours are not completed, the portion of the permit for mowing in the narrow shoreline variance would be revoked and all mowing in the narrow shoreline variance would be ceased. Mowing in the mowing and underbrushing zone could continue until the permit expiration date.

Mitigation for a narrow shoreline variance would be a onetime mitigation requirement. Once a section has been mitigated, there would not be any mitigation requirements if the property adjacent to federal property changes ownership or when permits are renewed.

Chapter 7: Cumulative Impacts

Cumulative impacts (or synonymously, cumulative effects), as defined by the Council on Environmental Quality regulations (40 CFR 1508.27), refer to the impacts on the environment that result from the incremental impact of the action when added to other past, present and reasonably future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. This definition encompasses the following implications relative to this programmatic environmental assessment:

- the action refers to modifying established guidelines for adjacent landowner activities on Federal lands at Grapevine and Lewisville Lakes

- the direct and indirect incremental impacts (effects) of the proposed action itself represent a key criterion in determining if cumulative effects on localized and regional environmental and natural resources, ecosystems, and human communities need to be addressed (e.g., if the action has no effects on a given resource, then it is not necessary to address the existing cumulative effects which have occurred on the resource)

- for those cumulative effects which need to be addressed, it is necessary to consider the direct and indirect effects of past, present, and reasonably foreseeable future actions on the affected resources, ecosystems, and human communities (past actions can include those in the area prior to the adjacent landowner guidelines currently in place; present actions include those involving on-going habitat alterations [e.g. Corps' operations and maintenance activities at park sites, or other long-term permitted activities such as marinas and yacht clubs] and reasonably foreseeable future actions include those beyond mere speculation, but within the time frame for analysis)

- direct effects are those effects caused by the proposed action, past actions, present actions, or reasonably foreseeable future actions, which occur at the same time and place as the respective actions (40 CFR 1508.8a): indirect effects are caused by the respective actions and are later in time or farther removed in distance, but are still reasonably foreseeable (indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems) (40 CFR 1508.8b)

- the respective actions may have been, or would be, the result of decisions made by various governmental levels (Federal, state, or local) or the private sector; further, such actions may be on or nearby Grapevine or Lewisville Lake, or off-site (the key issue is that common resources, ecosystems, or human communities are being affected by both the adjacent landowner guidelines and these other activities)

- cumulative effects need to be analyzed relative to a place-based perspective (the situation at the Grapevine and Lewisville Lakes and in nearby areas) regarding the specific resources, ecosystems, and human communities being affected

- each affected resource, ecosystem, and human community must be analyzed in terms of its sustainability and capacity to accommodate additional effects, based on its own time and space parameters

The 11-step CEA methodology published in 1997 by the Council on Environmental Quality (CEO) was utilized as the framework for this cumulative effects study (Council on Environmental Quality, 1997). The concepts embodied in the 11 steps are also included in a U.S. Environmental Protection Agency report related to the review of cumulative effects information in environmental impact statements (EISs) (U.S. Environmental Protection Agency. 1999).

The initial step focused on establishing the direct and indirect impacts of the existing adjacent landowner guidelines and the anticipated impacts of changing those guidelines discussed in Chapter 4. The focus was on those resources, ecosystems, and human communities that have been or would be impacted under a series of reasonable adjacent landowner activities alternatives.

- the primary direct effect discerned in the programmatic environmental assessment involves habitat modification induced by mowing and underbrushing or by implementing ecosystem based vegetation management prescriptions.

- the primary indirect effects discerned in the programmatic environmental assessment involves: (1) water quality changes that may occur after habitat alteration (for example, increased erosion if the mowing/underbrushing zone is larger); (2) effect on adjacent landowners access to the lake's shore (e.g. more difficult access if the mowing/underbrushing zone is smaller), costs of removing or discouraging undesirable species (e.g. rodents, snakes) on their private property and risk of damage or loss of property due to wildland fires starting on Federal lands and crossing to private lands.

The geographic scope of this cumulative effects analysis was dependent on the affected resources, ecosystems, and human communities within the vicinity of Grapevine and Lewisville Lakes. Further, it was necessary to utilize different boundaries for some of the impacted items. For the habitat alteration, the geographic scope includes the Federal lands at Grapevine and Lewisville Lakes, as well as the north central

Texas regional context of the Blackland Prairies and the Cross Timbers ecosystems. For water quality, the lakes themselves represent the geographic scope. For the human community, adjacent landowners comprise the geographic scope.

The time frame of this cumulative effects analysis included the past, present, and future. The historical (past) boundary (or reference point) utilized for habitat considerations was based on information recorded about the Blackland Prairies and Cross Timbers in the mid 1800's, while historical conditions for water quality considerations and adjacent landowners was based on conditions known just prior to the construction of the two lakes. Historical trends, up to the current time, for the impacted resources, ecosystems, and human communities were also considered. The future time boundary selected, 50 years, was based on the length of time that water supply contracts and renewals are issued.

The baseline condition for examining cumulative effects on the resources, ecosystems, and human communities that could be affected by modifying allowable adjacent landowner activities was considered to be those conditions that existed in the early- to mid-1800's, at about the time large numbers of European American pioneers began altering the landscape for agricultural purposes. Descriptions of those conditions is perhaps best gleaned from Francaviglia's (2000) book *The Cast Iron Forest*, which describe the natural conditions that encouraged the Cross Timbers and Blackland Prairies, the natural history of the area as described by early European Americans, and how the Cross Timbers were transformed by those pioneers.

Francaviglia states that farmers could not settle much of the area without the hard work of an axe, so settlers preferred the adjoining grasslands for farming as long as there was enough wood nearby for constructing homes. Jordan (1975) noted "[*T*]*he early Anglo-Texans, rather than being repelled by grasslands, were quite favorably inclined toward them and actually sought out prairies as places to settle, so long as timber was available in the vicinity.*" As a result, Francaviglia suggests that the forested areas in the Cross Timbers were settled relatively late. Jordan concluded that "[*C*]*onsequently, it was the late-comers who settled either the closed forests, where no prairies were present, or the open grasslands devoid of timber*."

Other factors that encourage human settlement were access to dependable water and transportation routes. As Gutmann and Sample (1995) noted in their interpretation of early Texas settlement "[*W*]*e found that water was important, but that man's other means of manipulating the environment – especially the transportation network – probably contributed as much or more to the extent to which people lived in rural Texas"*.

This pattern, people selecting areas where grasslands, trees, water and transportation coincide to build homes, continues in recent times as was implied when the original adjacent landowner activities guidelines were developed, in the early to mid 1970's (see USACE, 1971; 1973; 1976a; 1976b). Those documents describe the environmental conditions that occurred in the early 1970's, highlighting the pressure that an expanding Dallas-Fort Worth population was exerting on Cross Timbers and grasslands surrounding both lakes. It is expected that this pressure would continue on lands adjacent to the lakes as development around the lakes continue and the existing habitat adjacent to the lakes is lost.

Other actions examined for this cumulative effects analysis included past actions, present actions, and reasonably foreseeable future actions (RFFAs), regardless of whether these actions have been or would be done by governmental agencies or the private sector. Some RFFAs are difficult to identify with any specificity due to uncertainties related to approvals, funding, etc. The primary reference document used to delineate historical and current actions was the Lewisville Lake Programmatic Environmental Assessment (USACE, 1999). Ten categories of reasonably foreseeable future actions of particular relevance to Grapevine and Lewisville Lakes are future development around the lakes, future adjacent landowner activities, maintaining or building bridges and roadways, water-related developments, enhancements of parks, utilities within and outside exiting easements, construction of golf courses, construction of hotels, hike/bike trails, and land use classification changes.

The cause-and-effect relationships between human activities and resources, ecosystems, and human communities were considered by identifying and describing common pathways or connections between the adjacent landowner guidelines, related past, present, and reasonably foreseeable future actions, and the affected resources, ecosystems, and human communities. Mowing and underbrushing causes alteration of habitat as do myriad human activities in the area. Mowing and underbrushing can effect water quality from

erosion and the potential use of herbicides as do other human activities such as erosion induced from construction or agricultural activities in the area. Mowing and underbrushing can alter the access that adjacent landowners have to nearby lakes unlike most other activities.

Ideally, the magnitude of cumulative effects would be quantified in order to assess the cumulative significance of altering adjacent landowner guidelines on habitat alteration, water quality and adjacent landowners. However, such data were not available. For example, the number of acres of Cross Timbers that have been altered by humans since the early- to mid-1800's has not been measured. While maps from as early as 1849 show the Cross Timbers, we can only estimate the area that they occupied at that time and reasonably conclude that most of the Cross Timbers have been altered by humans over the past 150 years. Likewise, we must use our professional judgment when interpreting historical documents (e.g. Duck and Fletcher, 1943) that noted that the region's faunal diversity could be attributed to its being a forest-grassland ecotone that contains dominants from both the deciduous (forest) formation and the grassland formation. These studies lead to a professional opinion that native Cross Timbers and Blackland Prairies are under tremendous human pressure, and since there is relatively little Federal lands in Texas, what is left of the Cross Timbers and Blackland Prairies on Federal land needs maximum protection. This opinion is mimicked by the Texas Parks and Wildlife Department (Schmidly, Parker and Baker, 2001). While there are no studies available that indicate how much erosion and/or herbicides have entered Grapevine and Lewisville Lakes, we must approximate the impact by looking at studies that have examined water quality near riparian buffers as well as the water quality exceedances that have been reported at Grapevine and Lewisville Lakes. Those reports indicate that the exceedances that have occurred at the two lakes involve nutrients (and pH), and the water quality studies examined indicate that a riparian buffer protects water quality from excessive nutrient pollution. Likewise, we have no way of quantifying the number of encounters that adjacent landowners have with species they would rather not encounter, but can only estimate the potential number of adjacent landowners that might eventually live next to one of the lakes and compare that to the human population in the region. Finally, we can only qualitatively assess the number of access path that might occur under the individual access path or the community access path alternative.

Therefore, significance of cumulative effects was determined based upon the qualitative analysis of the magnitude of cumulative effects discussed above, and a consideration of historical, current, and forecasted conditions for the affected resources, ecosystems, and human communities within the temporal and spatial boundaries defined above, along with relevant regulatory thresholds and professional judgment. For Grapevine and Lewisville Lakes, three direct and indirect incremental impacts have been identified: habitat alteration (direct impact to an ecosystem), water quality (indirect impact to a resource) and adjacent landowners (indirect impact to a human community). The incremental impact on these three environmental factors triggers an examination of the cumulative effects on these three factors by other past, present and reasonably future actions. While direct and indirect effects may be negligible, the total cumulative impact may be significant. Table 7-1 indicates significance thresholds that were used in this programmatic environmental assessment for each of these three environmental factors.

Table 7-1. Cumulative Effects Significance Thresholds.

Incremental effect	Cumulative beneficial significance threshold	Cumulative adverse significance threshold
Habitat alteration	Most of former Blackland Prairie or Cross Timbers protected or restored.	Last of Blackland Prairie or Cross Timbers altered.
Water Quality (turbidity, herbicide contamination)	Water quality (turbidity and herbicides) brought into compliance with water quality standard where it was out of compliance.	Water quality (turbidity and herbicides) out of compliance with water quality standard.
Adjacent Landowner	Access to shoreline essentially unobstructed. Encounters with undesirable species on private land eliminated. Risk of wildland fires damaging or destroying structures on private land eliminated.	Access to shoreline effectively obstructed. Encounters with undesirable species on private land constant. Risk of wildland fires damaging or destroying structures on private land substantially higher than natural risk.

Because the allowable adjacent landowner activities represents a management activity, the alternatives examined all had measures to avoid, minimize, or mitigate significant cumulative effects. For example, some alternatives have a reduced width of the mowing/underbrushing zone, which minimizes the amount of habitat alteration. Additionally, ecosystem based vegetation management plans have been suggested that can lead to altered erosion potential and ultimately alter water quality in the lake, and change the accessibility that adjacent landowners have to the shoreline. Finally, the ecosystem based vegetation management activities to be implemented in the habitat management zone are considered to be adaptive ecosystem management plans. Therefore if unanticipated effects are observed as a result of implementing any of the vegetation prescriptions, appropriate changes in the management strategy would be examined.

Table 7-2. Cumulative Effects of Preferred Alternative and Other Past, Present and Reasonably Foreseeable Future Actions.

Time	Action	Impacts on Environment[1]			Comments
		Habitats	Water Quality (turbidity and herbicides)	Human Community (access, encounters, wildfires)	
Past	Construction of reservoirs	a	a	b	The primary impacts from past actions were induced by the construction of the reservoirs. EISs were written for the maintenance and operations of those reservoirs.
	Rise in Pool Elevation	a	nc	b	
	Vegetation Modification	a	a	b	
	Water-related recreation	a	a	b	
	Land Use Classification Changes	a	a	b	
Present	Vegetation Modification	a	a	b	Habitat modification from development around the reservoirs has been substantial. The incremental increase in habitat modification from mowing/underbrushing could mimic the impact of a large development. Water quality impact from water related recreation was limited in a recent carrying capacity environmental assessment that set limits on the number of boats allowed on lakes.
	Water-related recreation	a	a	b	
	Current Adjacent Landowner Activities	a	a	b	
Future	Future Development around the Lakes	a	a	b	All actions from Lewisville Lake PEA 1999- all adverse impacts either temporary during the construction phase or not considered significant
	Future Adjacent Landowner Activities	b	a	b	
	Bridges and Roadways	a	a	b	
	Water-Related Development	a	a	b	
	Enhancement of Parks	a	a	b	
	Utilities Within Existing Easements	a	a	b	
	Utilities Outside Existing Easements	a	a	b	
	Construction of Golf Courses	a	a	b	
	Construction of Hotels	a	a	b	
	Hike/Bike Trails	a	a	b	
	Land Use Classification Changes	a	a	b	
Significance Threshold Crossed?		No	No	No	

[1]a-small adverse, A-significant adverse, b-small beneficial, B-significant beneficial, nc-no change; see Table 7-1 for cumulative effects significance thresholds.